



READY TO RESHAPE



Luca Rozzoni of Chatsworth Products discusses best practice approach to thermal management and optimising your data centre for the future.

As technologies surrounding cloud computing and convergence continue to evolve, the data centre industry is increasingly being tasked with supporting these platforms and the way data centre resources are being utilised is changing. Data centres are having to reshape their strategies to allow for greater capacity and to ensure they can provide the highest quality,

uninterrupted service that is being demanded of them.

Data centre decision makers must work to identify where their resources are currently allocated and how they can best be optimised. Key to this is embracing the latest thermal efficiency and power and environmental monitoring strategies. New kinds of cooling technologies and power systems aim to create an even healthier data centre ecosystem capable of evolving with new trends.

Data centre managers must be careful not to limit themselves with architectures that specify limited power capabilities. It's important to define power requirements and monitor power use, not only to know how much power is being used, but to make the environment more efficient, and identify ways to save on power based on requirements. For example, certain power heavy racks may need to be distributed more efficiently and, as space becomes a

concern, systems that can support space conscious upgrade cycles could be critical.

Optimising your data centre cooling for the unknown demands of the future

Data centre cooling must be a big consideration in the cloud based data centre age. Poor separation of hot and cold air expose the data centre to cooling energy inefficiencies (causing loss of cooling effectiveness), that can be caused by air leaking through cabinets (allowing hot air circulation back into equipment inlets instead of flowing into the CRAC units) and airflow obstructions (that constrict cooling airflow).

To combat these challenges, aisle containment systems that address efficient thermal management should be deployed. Efficient aisle control, as well as good environmental management, are key to helping a data centre to remain environmentally friendly. Cold aisle containment, for example, can reduce fan energy by 20–25 per cent, and deliver 20 per cent energy savings from the chiller, all while paying for itself in about two years, according to PG&E.

As rack heat densities increase, data centre managers should look for holistic cooling optimisation approaches such as airflow containment systems, cabinets with enhanced sealing features and energy efficient computer room layouts.

Seven best practices

The way data centres utilise their resources will undoubtedly continue to change as new technologies keep emerging. Furthermore, as more devices become integrated with the Internet of Things (IoT), downtime will not be an option. With this in mind,

here are seven best practices to be taking into consideration:

■ Address airflow management

In airflow management, the separation of hot and cold air within the server room is the first critical step to maximising cooling system efficiency. The segregation of hot and cold air has the ability to improve chiller efficiencies, reduce the total plant cooling capacity, and create more hours of 'free cooling', helping justify an economiser that otherwise might not have provided adequate payback.

There are three basic solutions:

- A vertical exhaust duct at the top of the cabinet to remove hot exhaust air from the cabinet
- Hot aisle containment, which is an enclosure built around the hot aisle that provides strong seal to minimise leakage
- Cold aisle containment, which is an enclosure built around the cold aisle that provides strong seal to minimise leakage

By specifying cabinets that can provide a complete front/rear seal around equipment, airflow through the equipment can be maximised. This typically requires an extra set of baffles for use within the cabinet, blanking panels for open rack spaces and a barrier at the base of the cabinet.

■ Remove barriers to higher power/heat densities

Removing constraints around critical airflow design opens the door to higher power and heat densities. This isolation is accomplished by a combination of accessories such as blanking filler panels, equipment mounting area perimeter sealing air dams and floor-tile cut-out brush seal grommets, along with a system



to remove the return air from the room into a suspended ceiling return air space.

■ Track rack conditions and environmental variables

Keeping track of environmental variables will help create a more efficient rack design. Some servers generate more heat, while others may need more power. By seeing what system is taking up which resources, data centre managers can optimise their operations.

It's important to work with solutions that can provide the ability to look into the thermal and environmental performance of your infrastructure, giving you the ability to monitor, record and analyse environmental security and safety

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conditions in the data centre and equipment rooms. Modern vendor neutral DCIM software will enable an organisation to make better decisions on how to build its rack infrastructure and allow the data centre manager to securely keep tabs on all aspects of the data centre from a single web browser.

■ Power monitoring

Power monitoring is not only about making sure you know how much power is being used, but actually helping make the environment more efficient. It's essential to look for ways to save on power based on requirements. Intelligent power distribution units (PDUs) with monitoring capability that can stand the high heat loads of a high density environment can prove to be great

assets, enabling the monitoring of voltage, current, power (kW) and energy (kilowatt-hour) levels with a $\pm 1\%$ metering accuracy for each PDU in the data centre.

■ Cooling monitoring

Tracking inlet temperatures against the latest ASHRAE guidelines and evolving equipment specifications is key. Ensuring that IT systems are running optimally will revolve around how well the environmental variables are controlled.

■ Monitor uptime and status reports

It's imperative to check individual system uptime reports regularly and keep an eye on the status of various systems. Efficiency modifications can be made based on the status

reports provided by a reliable reporting system.

■ Budget for new airflow and HVAC optimisation systems

With a ducted exhaust system, every bit of cold air produced by the HVAC system has to go through a server, so there is no waste. There is also no bypass or need for the overprovisioning that is required in standard hot aisle/ cold aisle data centres.

In conclusion, taking this type of best practice approach, and adopting the latest technologies, will be vital in achieving a data centre capable of supporting the needs for future technologies' demands. Organisations are going to have to start taking data centre infrastructure to a new level. The question is: Are they ready? 

INTELLIGENT

R&MinteliPhy – Automated Infrastructure Management by R&M

Manually managed infrastructure data has a 10% error rate*, 20-40% of ports are forgotten over time**. The automated R&MinteliPhy solution continuously monitors each connection in one or more DCs or local networks, a (remote) central server records cabling status.

The AIM-based solution has functions for management, analysis as well as planning cabling and cabinets. R&MinteliPhy is easy to retrofit and can halve network monitoring and management costs.

When new devices are integrated or changes made updates are automatically generated. Unused patch panels and ports in active equipment are instantly detected. Data can be traced in real time with a PC or smartphone, faulty connections are located in seconds.

* Source: Watson & Fulton
** Source: Frost & Sullivan

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Convincing cabling solutions